

B-8 for imc CRONOS-SL (CRSL/B-8)

8-channel bridge measurement amplifier for multi-channel, dynamic strain gauge applications

The **B-8** is a DC bridge amplifier with 8 differential analog inputs of higher bandwidths allowing the measurement of:

- Voltage and current (20 mA)
- Strain gauges, bridge sensors
- IEPE/ICP sensors (with optional DSUB-15 plug)

For powering external sensors or bridge measurements, a software selectable sensor supply is integrated



imc CRONOS-SL-2 (back panel)



imc CRONOS-SL-2 (front panel)

Overview of available variants

Order code	article no.	remarks
CRSL/B-8-D	11800084	with DSUB-15 sockets
CRSL/B-8-L	11800085	with LEMO sockets

Included accessories

Documents
Getting started with imc CRONOScompact & imc CRONOS-SL (one copy per delivery / system)
Device certificate

Technical Specs - CRSL/B-8

Channels, measurement modes, terminal connection		
Parameter	Value	Remarks
Inputs	8	
Measurement modes DSUB-15	voltage measurement current measurement bridge sensor strain gauges current-fed sensors (IEPE/ICP)	shunt-plug ACC/DSUBM-I2(-IP65) or single end (internal shunt) full, half, quarter bridge with DSUB-15 extension plug: e.g. ACC/DSUBM-ICP21-BNC-S/-F, isolated
Measurement modes LEMO	voltage measurement bridge sensor strain gauges current measurement	full, half, quarter bridge Single-ended (internal shunt)
Terminal connection DSUB-15 LEMO	4x DSUB-15 8x LEMO.1B.307	2 channels per plug 1 channel per plug

Sampling rate, Bandwidth, Filter, TEDS		
Parameter	Value	Remarks
Sampling rate	≤100 kHz	per channel
Bandwidth	0 Hz to 48 kHz	-3 dB
Filter (digital) cut-off frequency characteristic order	10 Hz to 20 kHz	Butterworth, Bessel (digital) low pass or high pass filter 8th order band pass, LP 4th and HP 4th order Anti-aliasing filter: Cauer 8.order with $f_{\text{cutoff}} = 0.4 f_s$
Resolution	16 Bit	internal processing 24 Bit
TEDS only with B-8 (DSUB-15)	conforming IEEE 1451.4 Class II MMI	esp. with ACC/DSUBM-TEDS-xx (DS2433) not supported: DS2431 (typ. IEPE/ICP sensor)

General			
Parameter	Value typ.	min. / max.	Remarks
Overvoltage protection		±40 V	permanent
Input coupling	DC		
Input configuration	differential		
Input impedance	20 MΩ	±1%	
Auxiliary supply			only with DSUB-15 variant for IEPE/ICP expansion plug
voltage	+5 V	±5%	independent of integrated
available current	0.26 A	0.2 A	sensor supply, short-circuit protected
internal resistance	1.0 Ω	<1.2 Ω	power per DSUB-plug

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Input range	$\pm 10\text{ V}, \pm 5\text{ V}, \pm 2.5\text{ V}, \pm 1\text{ V} \dots \pm 5\text{ mV}$		
Gain error	0.02%	0.05%	of the measured value, at 25°C
Gain drift	$(10\text{ ppm/K}) \cdot \Delta T_a$	$(30\text{ ppm/K}) \cdot \Delta T_a$	$\Delta T_a = T_a - 25^\circ\text{C} $; with T_a = ambient temperature
Offset error	0.02%	$\leq 0.05\%$ $\leq 0.06\%$ $\leq 0.15\%$	of the input range at 25°C range $> \pm 50\text{ mV}$ range $\leq \pm 50\text{ mV}$ range $\leq \pm 10\text{ mV}$
Offset drift	$(\pm 0.7\text{ }\mu\text{V/K}) \cdot \Delta T_a$ $(\pm 0.1\text{ }\mu\text{V/K}) \cdot \Delta T_a$	$(\pm 6\text{ }\mu\text{V/K}) \cdot \Delta T_a$ $(\pm 1.1\text{ }\mu\text{V/K}) \cdot \Delta T_a$	range $\pm 10\text{ V}$ to $\pm 0.25\text{ V}$ range $\leq \pm 0.1\text{ V}$ $\Delta T_a = T_a - 25^\circ\text{C} $; with T_a = ambient temperature
Nonlinearity	10 ppm	50 ppm	
CMRR (common mode rejection ratio)	110 dB 138 dB	$> 90\text{ dB}$ $> 132\text{ dB}$	DC and $f \leq 60\text{ Hz}$ range $\pm 10\text{ V}$ to $\pm 50\text{ mV}$ range $\pm 25\text{ mV}$ to $\pm 5\text{ mV}$
Noise (RTI)	$0.6\text{ }\mu\text{V}_{\text{RMS}}$ $0.14\text{ }\mu\text{V}_{\text{RMS}}$	$1.0\text{ }\mu\text{V}_{\text{RMS}}$ $0.26\text{ }\mu\text{V}_{\text{RMS}}$	bandwidth 0.1 Hz to 1 kHz bandwidth 0.1 Hz to 10 Hz

Current measurement with shunt plug			
Parameter	Value typ.	min. / max.	Remarks
Input range	$\pm 50\text{ mA}, \pm 20\text{ mA}, \pm 10\text{ mA}, \pm 5\text{ mA},$ $\pm 2\text{ mA}, \pm 1\text{ mA}$		
Shunt impedance	50 Ω		external plug ACC/DSUBM-I2
Over load protection		$\pm 60\text{ mA}$	permanent
Input configuration	differential		
Gain error	0.02%	0.06% 0.1%	of reading, at 25°C plus error of 50 Ω shunt
Gain drift	$(15\text{ ppm/K}) \cdot \Delta T_a$	$(55\text{ ppm/K}) \cdot \Delta T_a$	$\Delta T_a = T_a - 25^\circ\text{C} $; with T_a = ambient temperature
Offset error	0.02%	0.05%	of range, at 25°C
Noise (current)	$0.6\text{ nA}_{\text{RMS}}$ $0.15\text{ nA}_{\text{RMS}}$	$10\text{ nA}_{\text{RMS}}$ $0.25\text{ nA}_{\text{RMS}}$	bandwidth 0.1 Hz to 1 kHz bandwidth 0.1 Hz to 10 Hz

Current measurement with internal shunt			
Parameter	Value typ.	min. / max	Remarks
Input range	±50 mA, ±20 mA, ±10 mA, ±5 mA, ±2 mA, ±1 mA		
Shunt impedance	120 Ω		internal
Over load protection		±60 mA	permanent
Input configuration	Single-ended		internal current backflow to -VB
Gain error	0.02%	0.06%	of reading, at 25°C
Gain drift	(15 ppm/K)·ΔT _a	(55 ppm/K)·ΔT _a	ΔT _a = T _a -25°C ; with T _a = ambient temperature
Offset error	0.02%	0.05%	of range, at 25°C
Noise (current)	0.6 nA _{RMS} 0.15 nA _{RMS}	10 nA _{RMS} 0.25 nA _{RMS}	bandwidth 0.1 Hz to 1 kHz bandwidth 0.1 Hz to 10 Hz

Bridge measurement			
Parameter	Value typ.	min. / max.	Remarks
Mode	DC		
Measurement modes	full-, half-, quarter bridge		bridge supply ≤5 V with quarter bridge
Input ranges	±1000 mV/V, ±500 mV/V, ±200 mV/V, ±100 mV/V ... bridge supply: 10 V ... ±0.5 mV/V bridge supply: 5 V ... ±1 mV/V bridge supply: 2.5 V ... ±2 mV/V bridge supply: 1 V ... ±5 mV/V		(as an option) (as an option)
Bridge excitation voltage (as an option)	10 V 5 V (2.5 V and 1 V)	±0.5% ±0.5%	The actual value will be dynamically captured and compensated for in bridge mode.
Min. bridge impedance	120 Ω, 10 mH full bridge 60 Ω, 10 mH half bridge		
Max. bridge impedance	5 kΩ		
Internal quarter bridge completion	120 Ω, 350 Ω		internal, switchable per software
Input impedance	20 MΩ	±1%	differential, full bridge
Gain error	0.02%	0.05%	of reading
Offset error	0.01%	0.02%	of input range after automatic bridge balancing
automatic shunt calibration	0.5 mV/V	±0.2%	for 120 Ω and 350 Ω
Cable resistance for bridges (without return line)	<6 Ω <12 Ω		10 V excitation 120 Ω 5 V excitation 120 Ω

Sensor supply				
Parameter	Value typ.		max.	Remarks
Configuration options	5 selectable settings			The sensor supply module always has 5 selectable voltage settings. default selection: +5 V to +24 V
Output voltage	Voltage (+1 V) (+2.5 V) +5.0 V +10 V +12 V +15 V +24 V (±15 V)	Current 580 mA 580 mA 580 mA 300 mA 250 mA 200 mA 120 mA 190 mA	Power 0.6 W 1.5 W 2.9 W 3.0 W 3.0 W 3.0 W 2.9 W 3.0 W	set jointly for all eight channels upon request, also 2.5 V and 1 V settings are available, for example by replacing the +12 V or +15 V setting. An arbitrary set of 5 setting can be chosen preferred selections: +24 V, +12 V, +10 V, +5.0 V, +2.5 V +15 V, +10 V, +5.0 V, +2.5 V, +1 V upon request, special order: +15 V can be replaced by ±15 V. This eliminates the internal current- and quarter bridge measurement.
Isolation	non isolated			output to case (CHASSIS)
Short-circuit protection	unlimited duration			to output voltage reference ground: "-VB"
Accuracy of output voltage	<0.25 %		0.5 % 0.9 % 1.5 %	at terminals, no load at 25 °C over entire temperature range plus with optional bipolar output voltage
Compensation of cable resistances	3-line control: SENSE line as refeed (-VB: supply ground)			calculated compensation with bridges
Max. capacitive load	>4000 µF >1000 µF >300 µF			2.5 V to 10 V 12 V, 15 V 24 V